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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/538,118      | 06/07/2005  | Yoshito Hashimoto    | 70404.62/ok         | 8790             |

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EXAMINER

HON, SOW FUN

ART UNIT PAPER NUMBER

1794

NOTIFICATION DATE DELIVERY MODE

11/21/2007

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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|                              |                                      |   |  |
|------------------------------|--------------------------------------|---|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/538,118 | <b>Applicant(s)</b><br>HASHIMOTO ET AL. |  |
|                              | <b>Examiner</b><br>Sow-Fun Hon       | <b>Art Unit</b><br>1794                 |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 June 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |  |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>6/05</u> | 6) <input type="checkbox"/> Other: ____  |

## **DETAILED ACTION**

### ***Claim Objections***

1. Claims 7-10 are objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim cannot depend on any other multiple dependent claim. See MPEP § 608.01(n). Claims 7-9 are examined for the case where they depend on independent claim 1, and claim 10 is examined for the case where claim 9, on which it depends, is dependent on independent claim 1.

### ***X-References in PCT***

2. The X-reference in the PCT application PCT/JP03/15748 is not used as anticipatory references in this Office action since the presently examined claims appear to have been amended.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-3, 6, 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Emerson (US 3,353,895).

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Regarding claims 1-2, Emerson teaches a plastic substrate (plastic carrier, column 2, line 8) that comprises a composite substrate in which fibers are embedded in a resin matrix (a layer of plastic cast on or applied to a surface carrying the filaments, column 2, lines 8-10), the fibers being arranged in at least one predetermined direction within a plane of the composite substrate (plane polarizer operating in a radial manner, column 1, lines 70-72), wherein the at least one predetermined direction includes two or more directions (extend outwardly as a plurality of spokes from a centrally located point, column 2, lines 1-2), and wherein the composite substrate substantially transmits visible radiation (predominantly transmitting white light, column 2, lines 14-15). The predefined retardation that is associated with the predetermined direction in which the fibers are arranged is expected to be inherent in the directional fibers. Emerson teaches that the plastic substrate is a light polarizer (column 1, lines 54-55), which is for use in optical instruments.

Regarding claim 3, Emerson teaches that the filaments 32 can be deposited in directions substantially at  $90^\circ$  to one another (column 6, lines 62-63), which means that the at least one predetermined direction can include two nearly orthogonal directions.

Regarding claim 6, Emerson teaches that filaments are deposited at  $45^\circ$  to the long direction of filaments 32 to form a quarter-wave retardation layer to form a circular polarizer (column 6, lines 30-40), which means that the composite substrate functions as a quarter-wave plate.

Regarding claim 8, Emerson teaches that the plastic substrate further comprises a protective coating on at least one principal surface of the composite substrate (protective coating 34 of clear plastic or lacquer, column 5, lines 10-13).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 4-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Emerson as applied to claims 1-3, 6, 8 above, and further in view of Aizawa (US 5,179,456).

Emerson teaches a plastic substrate for use in optical instruments, wherein the plastic substrate comprises a composite substrate in which fibers are embedded in a resin matrix, the fibers having arranged in at least one predetermined direction within a plane of the composite substrate, wherein the composite substrate substantially transmits visible radiation and has a predetermined retardation that is associated with the predetermined direction in which the fibers are arranged, and wherein the composite substrate functions as a quarter-wave plate, which is an optical compensator, as described above. Emerson fails to teach that the composite substrate has an in-plane

retardation of substantially zero, or that the composite substrate has negative uniaxial anisotropy.

However, Aizawa teaches that when the liquid crystal layer of a liquid crystal display device is homeotropically aligned (column 2, lines 13-20), an optical compensator having a negative uniaxial anisotropy ( $n_x=n_y>n_z$ , column 5, lines 45-48) is used in the display device, for the purpose of providing effective optical compensation for the positive optical anisotropy of the homeotropically aligned liquid crystal (column 2, lines 13-20), so as to widen the viewing angle of the display (column 3, lines 10-15). Aizawa teaches that the refractive indices in the orthogonal major axes of the optical plane are equal ( $n_x=n_y$ , column 5, lines 45-48), which means that the in-plane retardation is substantially zero (reduces the in-plane optical anisotropy to not higher than 1%, column 6, lines 55-60).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have provided the composite substrate of Emerson with a negative uniaxial anisotropy and hence an in-plane retardation of substantially zero, in order to provide effective optical compensation for the positive optical anisotropy of a homeotropically aligned liquid crystal layer in a liquid crystal display device, so as to widen the viewing angle of the display, as taught by Aizawa.

5. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Emerson as applied to claims 1-3, 6, 8 above, and further in view of Kahn (US 3,016,071).

Emerson teaches a plastic substrate for use in optical instruments, wherein the plastic substrate comprises a composite substrate in which fibers are embedded in a

resin matrix, the fibers having arranged in at least one predetermined direction within a plane of the composite substrate, and wherein the composite substrate substantially transmits visible radiation and has a predetermined retardation that is associated with the predetermined direction in which the fibers are arranged, as described above. In addition, Emerson teaches that the filaments 32 can be deposited in directions substantially at 90° to one another (column 6, lines 62-63), which means that the at least one predetermined direction can include two nearly orthogonal directions, for the purpose of providing a highly efficient light polarizer with the desired polarizing properties (column 1, lines 10-15). Emerson fails to teach that the fibers are embedded in the resin matrix as a woven fabric.

However, Kahn teaches that a woven fabric of fibers (strands, column 1, lines 50-53) arranged in two nearly orthogonal directions (parallel horizontal strands of light polarizing fibers 10 are interwoven with vertical strands of non-polarizing fibers 12, column 2, lines 12-20) can make an efficient light polarizer with the desired polarizing properties (column 2, line 1).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have used a woven fabric of fibers to provide the fibers arranged in two nearly orthogonal directions in the composite substrate of Emerson, in order to provide the desired polarizing properties, as taught by Kahn.

6. Claims 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Emerson as applied to claims 1-3, 6, 8 above, and further in view of Arakawa (US 2002/0060762 A2).

Emerson teaches a plastic substrate for use in optical instruments, wherein the plastic substrate comprises a composite substrate in which fibers are embedded in a resin matrix, the fibers having arranged in at least one predetermined direction within a plane of the composite substrate, wherein the composite substrate substantially transmits visible radiation and has a predetermined retardation that is associated with the predetermined direction in which the fibers are arranged, and wherein the composite substrate functions as a quarter-wave plate, as described above. The anisotropic axis of the composite substrate is associated with the predetermined direction in which the fibers are arranged. Emerson fails to teach that the plastic substrate, comprising the composite substrate that functions as a quarter-wave plate, is part of a liquid crystal display device along with a liquid crystal layer, where in addition, a polarizer is arranged such that the absorption axis of the polarizer is substantially perpendicular to the at least one predetermined direction in which the fibers are arranged in the composite substrate of the liquid crystal display device.

However, Arakawa teaches that a plastic substrate that functions as a quarter-wave plate, can be used as one of the substrates used to sandwich the liquid crystal layer in a liquid crystal display device, for the purpose of reducing the weight and the thickness, as well as of improving the shock resistance of the display device (page 1, [0014]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have use used the plastic substrate comprising the composite substrate that functions as a quarter-wave plate, of Emerson, as one of the



plastic substrates used to sandwich the liquid crystal layer in a liquid crystal display device, in order to reduce the weight and the thickness, as well as to improve the shock resistance of the display device, as taught by Arakawa.

In addition, Arakawa teaches that the liquid crystal display device further comprises a polarizer 32 disposed on one side of the liquid crystal layer 28, for the purpose of providing the desired linearly polarized light (page 8, [0084]). When the transmission axis of the polarizer is substantially parallel to the anisotropic axis of the composite substrate that functions as a quarter-wave plate, the linearly polarized light transmitted by the polarizer is transmitted by the quarter-wave plate if it passes through the liquid crystal layer unchanged. The absorption axis of the polarizer is perpendicular to the transmission axis of the polarizer, and is thus substantially perpendicular to the anisotropic axis of the composite substrate.

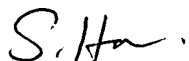
Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have additionally arranged a polarizer such that the absorption axis of the polarizer is substantially perpendicular to the anisotropic axis of the composite substrate, and hence the at least one predetermined direction in which the fibers are arranged in the composite substrate, disposed on one side of the liquid crystal layer of the liquid crystal display device, of Emerson in view of Arakawa, in order to provide the desired transmission of linearly polarized light, as taught by Arakawa.

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Any inquiry concerning this communication should be directed to Sow-Fun Hon whose telephone number (571)272-1492. The examiner can normally be reached Monday to Friday from 10:00 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rena Dye, can be reached on (571)272-3186. The fax phone number for the organization where this application or proceeding is assigned is (571)273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Sow-Fun Hon

11/09/07